

Branch Name:	Mechanical Engineering
Program Code:	ET101
Course Name:	Mechanical Engineering Laboratory-II (Design)
Course Code:	2ET1010504P
Pre-requisite Course:	Zeal to learn the course

Course Objectives:

1. To understand the measurement of mechanical properties of materials.
2. To understand the deformation behavior of materials.
3. To understand the kinematic and dynamic characteristics of mechanical devices.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
2	0	1	2	3	-	-	-	-	10	25	10	25	50

Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	Impact test on a metallic specimen.	02	10
2	Brinnell and Rockwell hardness tests on metallic specimen.	02	10
3	Uniaxial tension test on mild steel rod.	02	10
4	Torsion test on mild steel rod.	02	10
5	Microscopic examination of heat-treated and untreated metallic samples	02	10
6	Velocity ratios of simple, compound, epicyclic and differential gear trains	02	10
7	Kinematics of four bar, slider crank, crank rocker, double crank, double rocker and oscillating cylinder mechanisms	02	10
8	Cam & follower and motion studies	02	10
9	Single degree of freedom Spring-mass-damper system, determination of natural frequency and damping coefficient	02	10
10	Determination of torsional natural frequency of single and double rotor systems- undamped and damped natural frequencies.	02	10
11	Bending deflection test on beams.	02	10

Reference Books:

1. Theory of Machines and Mechanisms by R S Khurmi and J K Gupta, S. Chand & Company Ltd, 2017.
2. Mechanical Vibrations by S S Rao, Pearson, 2018.
3. Design of Machine Elements by V B Bhandari, Tata McGraw Hill, 2018.

4. Mechanical Metallurgy by George Dieter, McGraw Hill, 2018.
5. Introduction to physical metallurgy by Sydney Avner, Tata McGraw Hill, 2017
6. Mechanical Vibration by V P Singh, Khanna Publishers, 2017

E-Resources:

1. <https://nptel.ac.in/courses/112103111>

Course Learning Outcomes (CLO):

Students who have undergone the course will be able to understand the measurement of mechanical properties of materials and will be able to characterize the dynamic behaviour of mechanical systems

CLO	Description	Bloom's Taxonomy Level
CLO1	To Understand the measurement of mechanical properties of material.	1 Remembering 2 Understanding
CLO2	To characterize the dynamic behavior of the mechanical system.	3 Applying 4 Analyze
CLO3	To identify the structure and properties of material specimen.	2 Understanding 4 Analyze
CLO4	To understand the natural frequency of the mechanical system components.	2 Understanding 4 Analyze
CLO5	To understand the response of the vibratory systems.	4 Analyze 5 Evaluating
CLO6	To identify the dynamic response of the mechanical system.	4 Analyze

Mapping of CLOs with POs & PSOs:

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CLO1	M		M			M						L	M	M
CLO2		H	M			M	M					L	M	L
CLO3	M	H	M	M		M	M					L	M	L
CLO4	H	M	M	M	M								M	
CLO5	H	L	M										L	
CLO6	M			M	H	M					L		H	

H: High, M: Medium, L: Low